

Outreach and graduate recruiting efforts at FRIB



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U.S. DEPARTMENT OF
ENERGY

Office of
Science

MICHIGAN STATE
UNIVERSITY

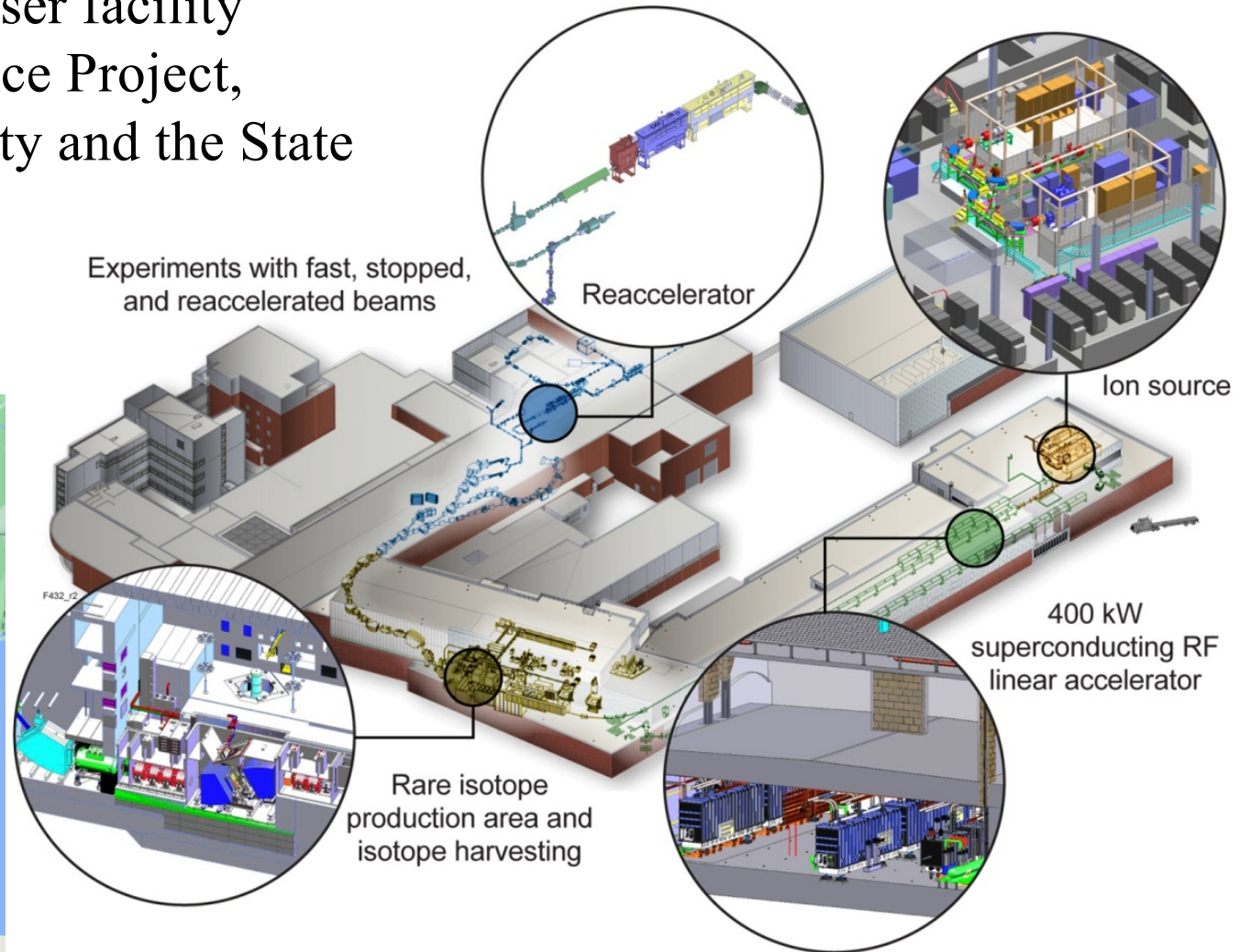


National Science Foundation

Facility for Rare Isotope Beams, FRIB

Michigan State University Campus

- Next Generation Nuclear Science Facility
- \$730 million scientific user facility
- By DOE Office of Science Project, Michigan State University and the State of Michigan
- Expected in 2022
- >50 years of experience



U.S. Department of Energy Office of Science
National Science Foundation
Michigan State University

The Education Pipeline @ MSU





Online activity: "Pennies are protons"






Virtual in 2020




Pre-High School

- GUPPY (grades 4-6) 
- MST@MSU (grades 7-10) 

High School

- PAN@MSU (& PAN@ND)  
 - PAN for teachers
 - High School Honors Science Program 

College

- NS³ – Nuclear Science Summer School 
- Research Assistantships
- Summer Research Experiences/REU 
- Conference Experiences for Undergrads 

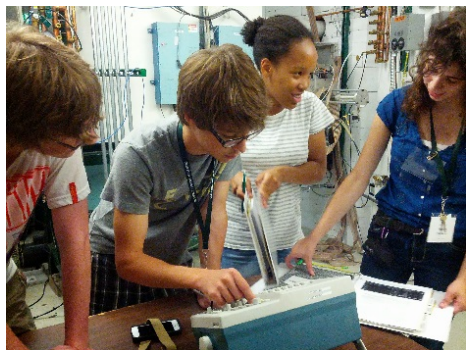
Graduate School

- Workshops/Schools
- Conferences
- Connections to open positions

Outreach & Education

Coordination/Collaboration/Complementarity of Outreach and Education efforts

- **Leadership:** Associate Director for Education, Faculty Outreach Advisor
- **Outreach Coordinator:** Zach Constan
- **Web Content & Graphic Designer:** Erin O'Donnell
- **Outreach committee:** with representation from faculty, research associates and graduate students
- **Graduate Recruiting Committee:** works closely with departments
- **Valuable Collaborators:** Joint Institute for Nuclear Astrophysics (JINA-CEE), and MSU partners, University of Notre Dame



Engaging the community

Larger audience/Less interaction

Social Media/Website

Digital Games, I5 museum

Science Festivals

Open Houses, Art shows

Talks/Webinars

Tours

Lessons/Activities

Camps/Workshops/Research

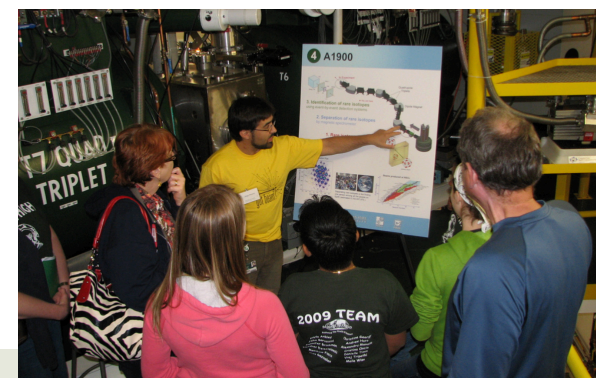
COVID-19 era

Smaller audience/More interaction

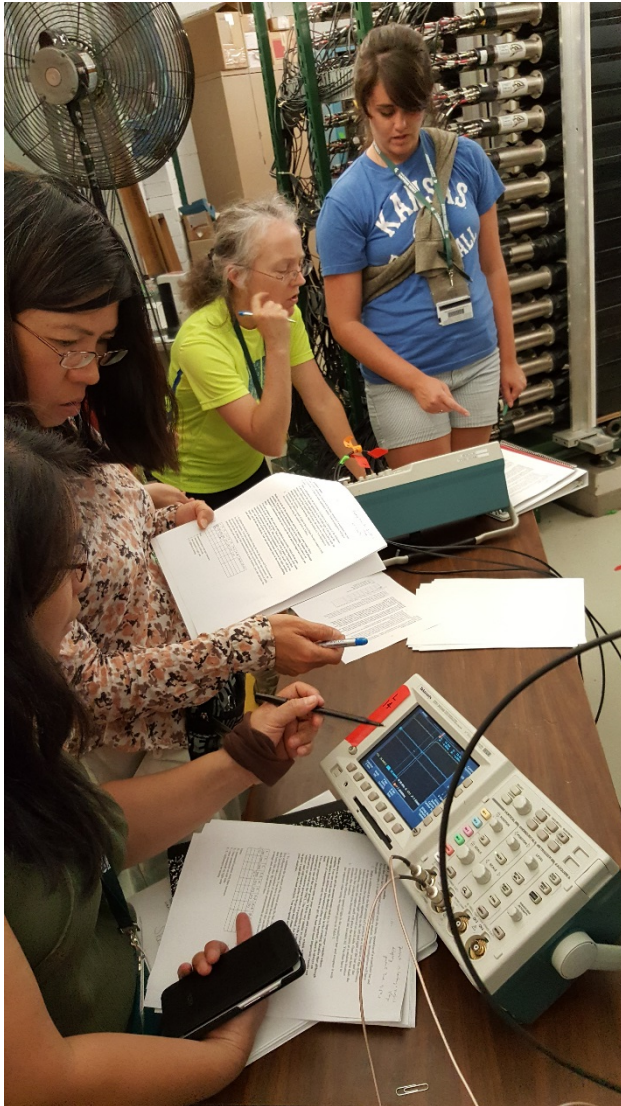


Traditional Engagements

- Summer camps (elementary, middle, high school)
- Research experiences for MSU undergrads during semester
- REU students over the summer
- CEU at the DNP meeting in the Fall
- Graduate recruiting booth at the DNP meeting in the Fall
- Laboratory tours (4000 visitors/year)
- Open houses (~3000 visitors)
- Public talks, school visits, science festivals



Teacher Engagement



- **In person trainings for teachers**

- **PAN** for teachers: week-long summer program
- One-day on-campus **seminars** (Coming up mid-March 2021)
- **PAN-cake**: teacher conference workshops at different states

- **Provide resources**

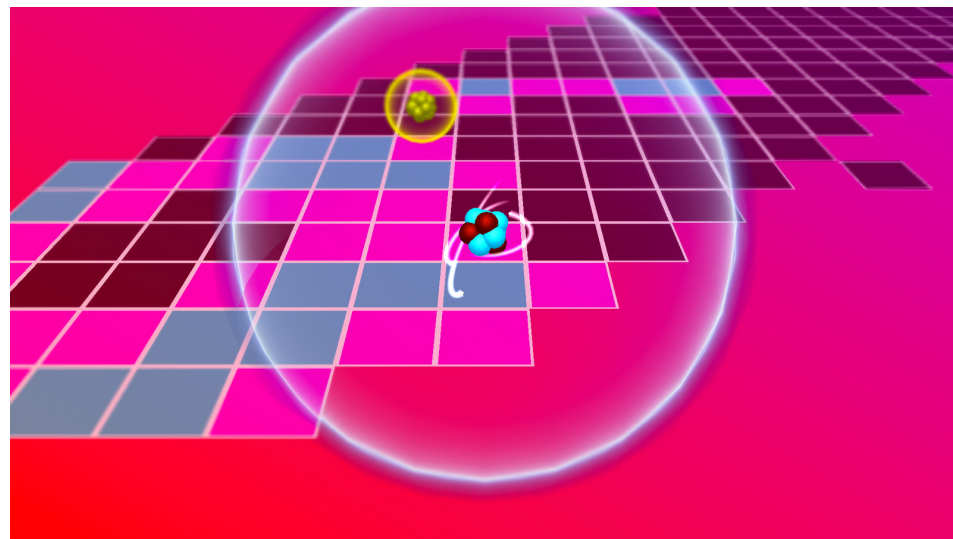
- Online website resources
- Demos + lesson plans (marble nuclei, lego, shadow box)
- **Isotopolis** video game + lesson plans
- Support teachers to train their peers

Digital Game: Isotopolis

Free to download on multiple platforms

- Touch-based game that guides the player through various stages of creating an isotope (ionization, separation, fragmentation)
- Funded by APS, NSCL, JINA, MSU partners
- Game available at Science museums, science festivals, the MSU Planetarium and more.
- Used in summer camps for hands-on activities with students
- Lesson plans under development
- Number of unique users > 15,000

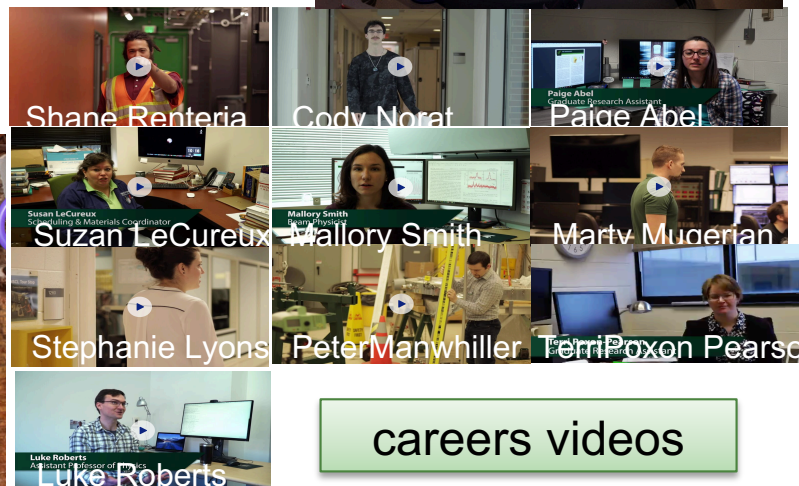
**Collaboration with Games for
Entertainment and Learning (GEL)
@ MSU**



Impression 5 Science Museum

- Impression 5: Lansing Science Museum
- Annual number of visitors: 120,000
- Collaboration for a nuclear science exhibit
- Sponsored by: NSCL + external community partners
- Since Aug. 2019

SMASH
A NUCLEAR ADVENTURE



careers videos

Art – Science Connections



Advanced Studies Gateway – Dean Lee (MSU)

Initiative that brings together researchers, innovators, creative thinkers, artists, and performers from all fields and strengthens ties between Michigan State University and the community.

All events are free and open to the public

Photo Exhibit

Since 2018 Lab is hosting a photo exhibit created by Elena Litvinova (WMU) as part of her NSF-CAREER award. Photos by Physicist Olga Pechenova (GSI).



Art-Science showcase by MSU SciCom

Art inspired by Science – exhibit at FRIB

+ public talk by YouTuber Dianna Cowern (aka Physics Girl)

Of Equal Place: Isotopes in Motion

The Partners:

- **Dance Exchange**_(Dance Company based in MD, founding director Liz Lerman received MacArthur “Genius Grant”)
- **MSU partners:** Wharton Center for performing arts, Office for vice president for research, Center for community and economic development
- **WaMPS**_(Women and Minorities in Physical Sciences)
- **Community** (Happendance, Schools)

March 24-26, 2022

2 days for schools

1 day for general public

The event

- 50-min dance performance
- Dance/physics workshops
- Physics Demos
- Laboratory tour
- Careers booth



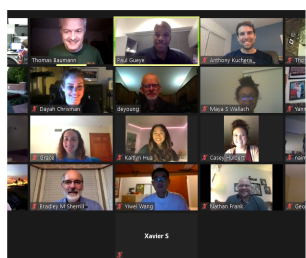
Dedicated MSI Programs Build Pipeline of Students Pursuing Nuclear Science

HS

BS

PhD

Faculty



PING

High school



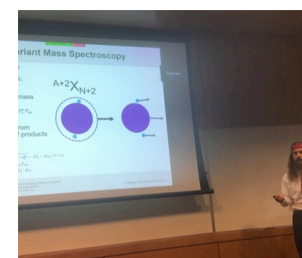
PEGASUS

Undergrads



MSI Research

Grad Students



Fellowship

Faculty

Physicists
Inspiring the
Next Generation
Research (AY)
Experiments



Two-Day Visit
Interest to
MSU/FRIB



Thesis Research



MSU/FRIB-MSI
Bridge

Student Training and Engagement Program for Undergraduates in Physics (STEP-UP)

Coordinator: Paul Gueye, MSU



U.S. Department of Energy Office of Science
National Science Foundation
Michigan State University

Director's Research Scholar Program Provides Undergraduate STEM Opportunities

- Opportunities for a diverse population of undergraduate students in STEM to engage in forefront research at FRIB
- Primary objective
 - Increase the population of minority and female researchers in STEM
 - Training the next generation of scholars, scientists, and leaders
 - Providing role models for future generations
- Some facts
 - Started in 2015
 - Funded over twenty-five undergraduate students
- Some research projects
 - Nuclear astrophysics
 - Accelerator physics
 - Heavy ion therapy
- Enhancing diversity in undergraduate research at FRIB



COVID-19 opportunities

■ MSU Science Festival partnership

- Virtual Tour of the lab
- Nuclear Physics Demos with material you can find at home
- Nuclear Science Lectures
- Talk on careers at FRIB
- Connections between art and science

■ Website update

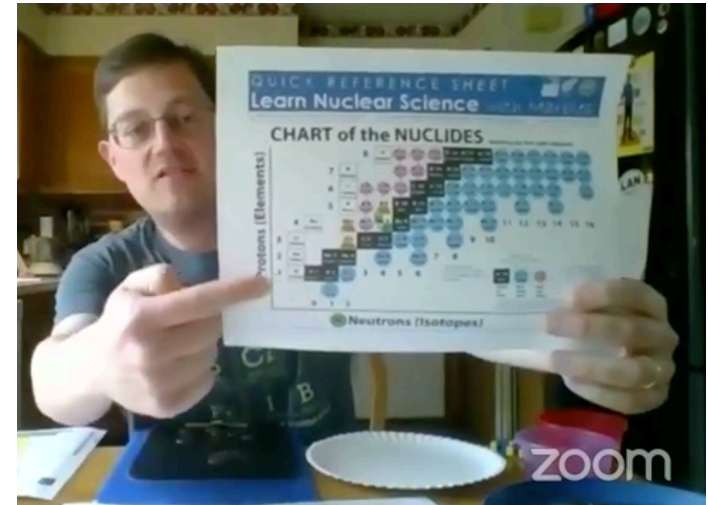
■ Social Media

■ Sharing new and old videos

■ School virtual field trips

■ Summer camps online

■ Open virtual tours of the lab



Summary

- FRIB offers a broad range of opportunities that **engage, inform and inspire** the general public and to attract a diverse pool of students.
- Activities range in time, intensity and engagement
- Continuously developing new programs and activities to reach diverse audiences
- New opportunities for outreach during the COVID-19 era

